

WHAT IS CLAIMED IS:

1. An optical communication apparatus for transmitting an intermittent optical signal from a transmitting side to a receiving side by using wavelength information of the optical signal as an address, the apparatus comprising:

5 m (m is a natural number not less than 2) optical transmitting circuits for sending the intermittent optical signal;

10 n (n is a natural number not less than 2) optical receiving circuits for receiving the optical signal from each of said optical transmitting circuits; and

 an optical transfer circuit for connecting each of said optical transmitting circuits and each of said optical receiving circuits, wherein

15 each of said optical transmitting circuits intermittently sends burst optical signals outputted by taking a provided intermittent signal as an original signal so as to prevent a collision among the burst optical signals,

 said optical transfer circuit multiplexes the burst optical signals outputted from said optical transmitting circuits, 20 separates the multiplexed burst optical signal into optical signals for every predetermined wavelength corresponding to said optical receiving circuits, and individually outputs the separated optical signals from n output ports provided thereto,

and

25 each of said optical receiving circuits converts the optical signal outputted from a corresponding one of said output ports into an electrical signal and intermittently outputs the electrical signal.

2. The optical communication apparatus according to claim 1, further comprising a wavelength traffic manager, wherein

each of said optical transmitting circuits includes a variable wavelength optical modulator for converting the 5 intermittent signal into the burst optical signal, setting a wavelength thereof to any one of n predetermined varying wavelengths corresponding to said optical receiving circuits, and intermittently sending the burst optical signal,

said wavelength traffic manager controls the wavelengths 10 of the burst optical signals sent from said variable wavelength optical modulators so as to prevent the wavelengths from coinciding with one another,

said optical transfer circuit includes

an optical multiplexer for multiplexing the burst 15 optical signals outputted from said optical transmitting circuits and outputs a multiplexed optical signal;

a wavelength separator for separating the multiplexed optical signal inputted from said optical multiplexer into optical signals of the predetermined wavelengths

20 corresponding to said optical receiving circuits, and individually outputs the separated optical signals from the n output ports, and

each of said optical receiving circuits includes an optical receiver for converting the optical signal outputted from the 25 output port corresponding thereto of said wavelength separator into the electrical signal, and intermittently outputting the electrical signal.

3. The optical communication apparatus according to claim 1, wherein

each of said optical transmitting circuits includes a carrier modulator for modulating a carrier having 5 a frequency unique to each of said optical transmitting circuits with the intermittent input signal to generate a burst modulated signal, and intermittently outputting the burst modulated signal, and

a variable wavelength optical modulator for 10 converting the burst modulated signal from said carrier modulator into a burst optical signal, setting a wavelength thereof to any one of n predetermined varying wavelengths corresponding to said optical receiving circuits, and intermittently sending the burst optical signal,

15 said optical transfer circuit includes an optical multiplexer for multiplexing the burst

optical signals outputted from said optical transmitting circuits, and intermittently outputting a multiplexed optical signal;

20 a wavelength separator for separating the multiplexed optical signal inputted from said optical multiplexer into optical signals of the predetermined wavelengths corresponding to said optical receiving circuits, and individually outputting the separated optical signals from the n output ports, and

25 each of said optical receiving circuits includes an optical receiver for converting the optical signal outputted from the output port corresponding thereto in said wavelength separator into an electrical signal, and intermittently outputting the electrical signal,

30 a filter for receiving the electrical signal intermittently outputted from said optical receiver, selectively passing any one of said burst modulated signals from said m optical transmitting circuits based on the received electrical signal, and outputting the passed burst modulated signal, and

35 a burst demodulator for demodulating the burst modulated signal intermittently outputted from said filter.

4. The optical communication apparatus according to claim 3, further comprising an optical sub-transmitting circuit, wherein

said optical sub-transmitting circuit includes

5

a carrier generator for multiplexing reference carriers that are equal in frequency to and have a predetermined relation in phase with the carriers unique to said optical transmitting circuits, and outputting a multiplexed signal,

10 an optical sub-modulator for converting the multiplexed signal outputted from said carrier generator into an optical signal having a predetermined wavelength that is different from said n predetermined varying wavelengths corresponding to said optical receiving circuits, and sending the optical signal,

15 said optical multiplexer multiplexes the burst optical signals outputted from said optical transmitting circuits and the optical signal outputted from said optical sub-transmitting circuit, and outputs a multiplexed optical signal,

20 said wavelength separator separates the multiplexed optical signal outputted from said optical multiplexer into optical signals for each of the predetermined wavelengths corresponding to said n optical receiving circuits and an optical signal having a wavelength equal to the wavelength of the optical signal sent from said optical sub-modulator, and individually 25 outputs the separated optical signals from the n output ports and a carrier output port provided thereto,

each of said optical receiving circuits further includes
an optical sub-receiver for converting the optical signal outputted from the carrier output port of said wavelength

30 separator into an electrical signal, and outputting the electrical signal, and

a sub-filter for receiving the electrical signal outputted from said optical sub-receiver, selectively passing any one of said m reference carriers based on the received electrical 35 signal, and outputting the passed reference carrier, and

said burst demodulator demodulates the burst modulated signal intermittently outputted from said filter with reference to the reference carrier outputted from said sub-filter.

5. The optical communication apparatus according to claim 4, wherein

said burst modulated signal is generated by any one of frequency modulation and phase modulation.

6. The optical communication apparatus according to claim 5, wherein

said burst demodulator carries out synchronous detection of the burst modulated signal intermittently outputted from said 5 filter with reference to the reference carrier outputted from said filter.

7. The optical communication apparatus according to claim 3, wherein

said carrier modulator modulates the carrier having the

frequency unique to each of said optical transmitting circuits
5 to generate the burst modulated signal and intermittently outputs
the burst modulated signal and the carrier,

each of said optical transmitting circuits further includes
an optical sub-modulator for converting the carrier outputted
from said carrier modulator into an optical signal having a
10 predetermined wavelength that is different from n predetermined
varying wavelengths corresponding to said optical receiving
circuits, and sending the optical signal,

said optical multiplexer multiplexes the burst optical
signals from variable wavelength optical modulator included in
15 each of said optical transmitting circuits and the optical signal
from said optical sub-modulator, and outputs a multiplexed
optical signal,

said wavelength separator separates the multiplexed
optical signal outputted from said optical multiplexer into
20 optical signals for each of the predetermined wavelengths
corresponding to said n optical receiving circuits and an optical
signal having a wavelength equal to the wavelength of the optical
signal sent from said optical sub-modulator, and individually
outputs the separated optical signals from the n output ports and
25 a carrier output port provided thereto,

each of said optical receiving circuits further includes
an optical sub-receiver for converting the optical
signal outputted from the carrier output port of said wavelength

separator into an electrical signal, and outputting the
30 electrical signal, and

a sub-filter for receiving the electrical signal
outputted from said optical sub-receiver, selectively passing any
one of said m reference carriers based on the received electrical
signal, and outputting the passed reference carrier, and
35 said burst demodulator demodulates the burst modulated
signal intermittently outputted from said filter with reference
to the reference carrier outputted from said sub-filter.

8. The optical communication apparatus according to claim
7, wherein

said burst modulated signal is generated by any one of
frequency modulation and phase modulation.

9. The optical communication apparatus according to claim
8, wherein

said burst demodulator carries out synchronous detection
of the burst modulated signal intermittently outputted from said
5 filter with reference to the reference carrier outputted from said
sub-filter.

10. The optical communication apparatus according to
claim 3, wherein

each of said optical receiving circuits further includes

5 a monitor for monitoring the electrical signal outputted from said optical receiver to determine whether the burst modulated signal from each of said optical transmitting circuits is present or not, and, if present, controls said filter to selectively passing a predetermined burst modulated signal for output.

11. The optical communication apparatus according to
claim 3, wherein

5 said filter and said burst demodulator are provided as many as the m optical transmitting circuits in each of said optical receiving circuits, and

each of said filters selectively passes a different one of the burst modulated signals from said m optical transmitting circuits, and intermittently outputs the passed burst modulated signal.